

# USER MANUAL

CTS602 LIGHT BY NILAN



Comfort 450 (English)

# TABLE OF CONTENTS

## Quick guide

Functions of control panel.....	3
Main screen elements.....	3
Settings options on the main screen.....	4
Warnings and alarms.....	5
Settings menu overview.....	6

## Service and maintenance

Bypass function.....	7
Humidity control.....	7
Maintenance.....	8
Water trap.....	8
Filter replacement.....	8
The exchanger.....	8
Illustration of filter change.....	9
Illustration of Pollen filter change.....	10

## User settings

Ventilation settings.....	11
Stop the unit.....	11
Alarm.....	11
Show data.....	12
Date/Time.....	13
Week program.....	14
After-heating.....	15
Air humidity.....	16
CO <sub>2</sub> .....	17
Air exchange.....	18
Air filter.....	18
Temp. regulation.....	19
Language.....	20

## Alarm list

Comfort unit.....	21
Alarm list.....	21

## Product data

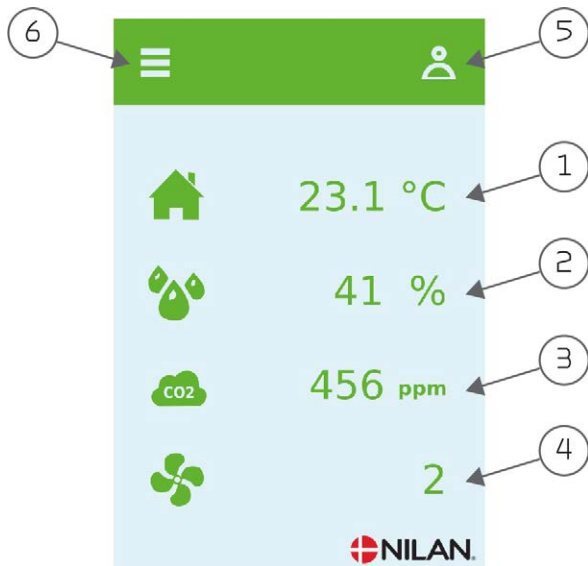
Declaration of compliance.....	23
Ecodesign data Comfort 450.....	24

# Quick guide

## Functions of control panel

### Main screen elements

The main screen of the HMI panel contains the settings options and the information that an operator mostly uses.



1. Shows the current room temperature in the house, measured via the extract air.
2. Shows the current air humidity.
3. Shows the CO2 level in the house, provided the unit is equipped with a CO2 sensor.
4. Shows the current fan speed level.
5. Shows user selection and week program if these are activated. If the unit is off, the stop symbol will be displayed and it will say "off" next to fan speed level. At warnings or alarms the alarm icon will be displayed.
6. Access to the settings menu, where there are several settings options.



User selection icon



Stop icon



Week program icon



Alarm icon

## Settings options on the main screen

The settings options which the user needs in daily life can all be controlled from the main screen of the panel.



If you select the option of current room temperature, the desired room temperature will be displayed.

The desired room temperature can be adjusted by pressing the up-or-down arrows followed by the cancel icon (bottom left) or the accept icon (bottom right).



If you select the option of current fan speed level, the desired fan speed level will be displayed.

The desired fan speed level can be adjusted by pressing the up-or-down arrows followed by the cancel icon (bottom left) or the accept icon (bottom right).

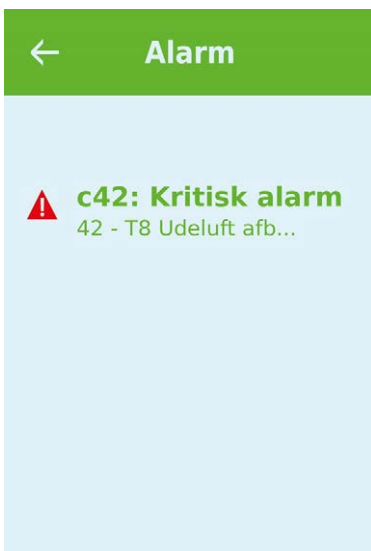
## Warnings and alarms

Should an error occur in the operation of the unit, a warning or an alarm will be displayed. A warning will be displayed in the top righthand corner in the menu bar.



If you select the symbol, a description of the warning or the alarm will be displayed.

The warning or the alarm can be reset by selecting "Clear Alarm".



A warning indicates that something requires attention, for instance that filters need changing.  
The unit operates normally.



An alarm indicates a serious fault with the unit that is likely to require an expert.  
The unit has stopped.

## Settings menu overview

The settings menu is constructed to make it easy to navigate through.



# Service and maintenance

## Bypass function

When the current room temperature is above the desired temperature, there is no longer need for heat recovery. In this situation, open bypass and let outside air pass the heat exchanger sober. This results in lower internal pressure in the unit and you thereby save energy on fan operation.

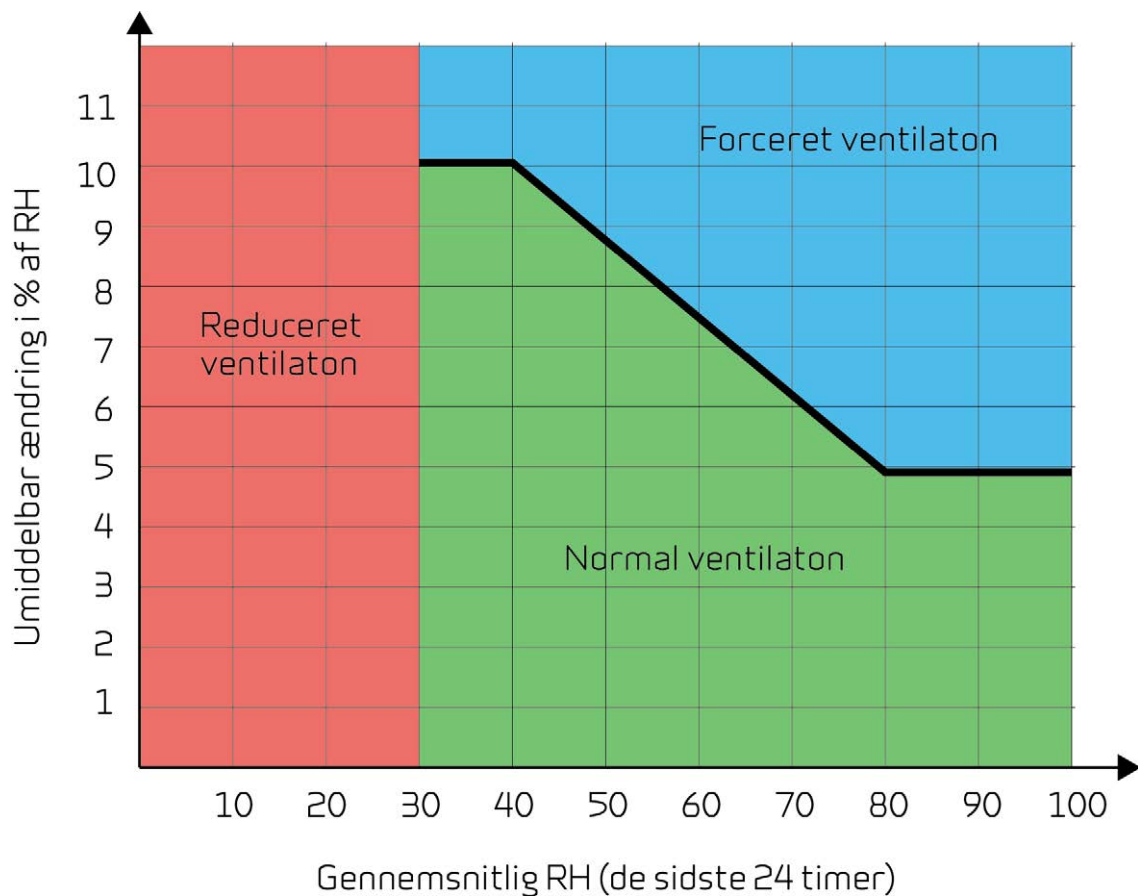
## Humidity control

As a standard the unit is fitted with an intelligent humidity control system that automatically adjusts to the requirements of the family or the building.

By means of the integral humidity sensor, the control system calculates the average level for the previous 24 hours. The average level determines whether fluctuations in the air humidity in the extract air make it necessary to alter the air exchange. At the same time it adjusts to the air humidity levels of summer and winter.

If the air humidity increases by more than 5-10% (summer/winter), forced ventilation is activated in order to lower the humidity level as quickly as possible. If the average air humidity falls below the set level for low humidity (set default at 30%), the unit will reduce operation and air exchange rate, in order not to dehumidify the dwelling further.

The automatic humidity control system saves energy on operation and helps ensure a comfortable dwelling.



## Maintenance

Nilan's ventilation units last for many years, but to get the best out of them whilst avoiding unnecessary electricity consumption, correct maintenance is important.

The following parts require regular maintenance:

- Water trap
- Filters

### Water trap

The water trap can dry out and prevent water from draining from the condensate tray, because air will then blow into the unit. Condensate water will accumulate in the condensate tray. This will eventually overflow and potentially cause water damage to the surface supporting the unit.

The water trap should therefore be checked regularly and filled with water, especially in the summer when the risk of the water trap drying out is highest.

### Filter replacement

The purpose of the filters is to protect the fans and the heat exchanger from dust and dirt, which may cause damage.

For operation to run smoothly, it is important to change the filters as required. The filter timer in Nilan's control system is set by default to indicate that filters should be replaced after 90 days, but this can be changed as required to 180 or 360 days.

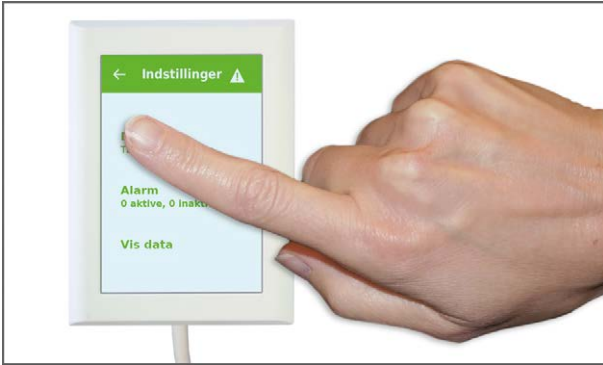
If the filters are not changed, ventilation will lessen. This may cause the indoor climate to deteriorate and affect the automatic humidity control system of the unit.

### The exchanger

The exchanger should be checked for dust and dirt every two years to ensure that air can pass through unhindered. A blocked exchanger will increase power consumption.



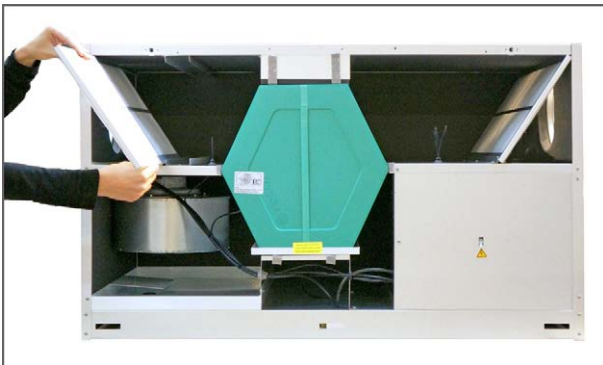
## Illustration of filter change



1. Before opening the door, switch the unit off on the control panel under OPERATION. This is situated in the main menu SETTINGS



2. The screws loosened in the upper cover and pull the cover lifted out



3. Remove the two filters from the unit



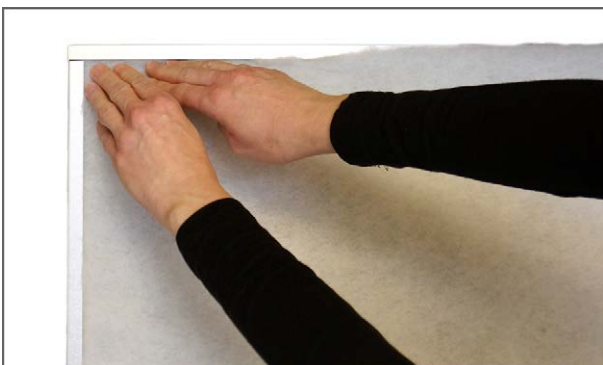
4. It is advisable that you vacuum the filter chambers for potential dirt and dust



5. Remove the filter sheet from the filter frame



6. Keeping the smooth side facing downwards, place the new filter sheet in the filter frame

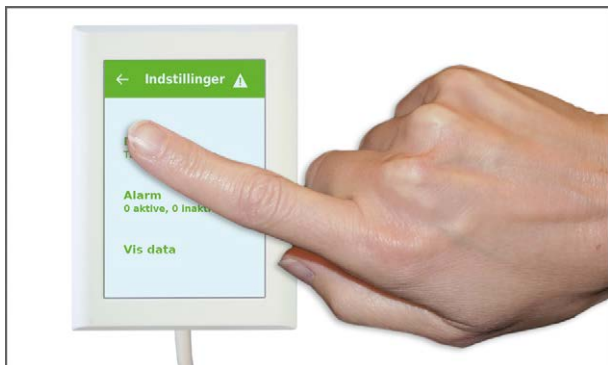


7. Press the filter sheet firmly in place and carefully push it to the sides of the filter frame. The filter is placed back in the unit with filter mat upward

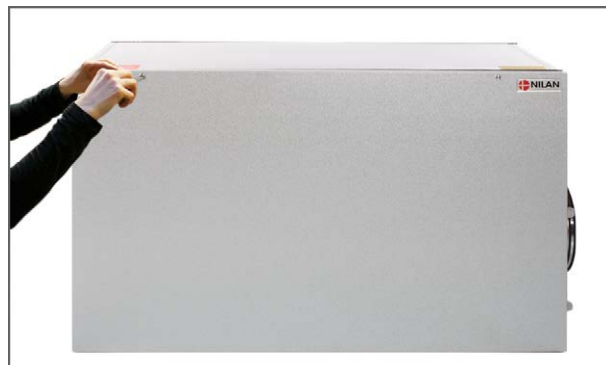


Go View menu ALARMS on betjeningspanet and reset the alarm here

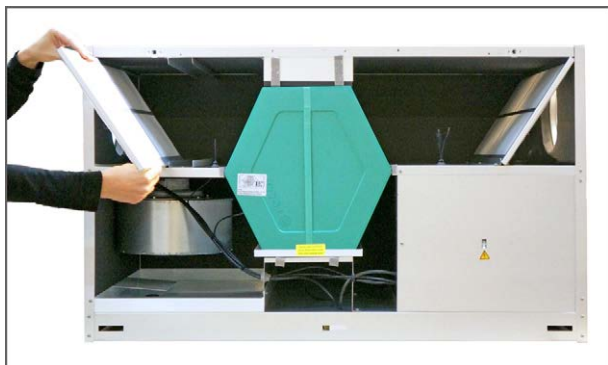
## Illustration of Pollen filter change



1. Before opening the door, switch the unit off on the control panel under OPERATION. This is situated in the main menu SETTINGS



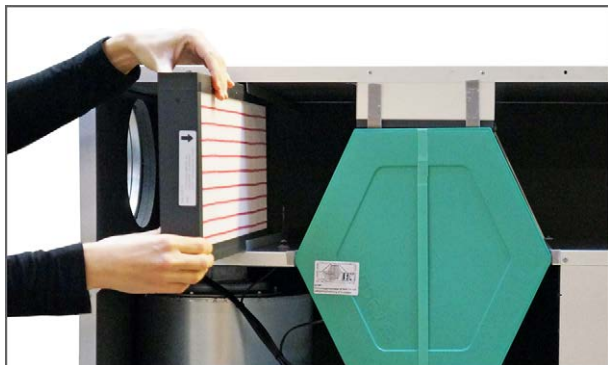
2. The screws loosened in the upper cover and pull the cover lifted out



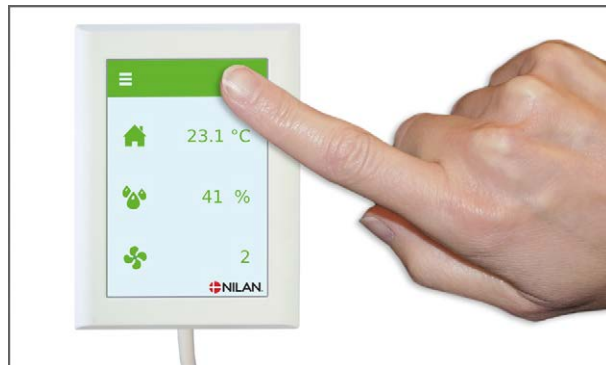
3. Remove the filter from the unit



4. The new pollen filter must face the arrow away from the duct connections.



5. The pollen filter is inserted into the marked trail and the door is closed again.



6. Go View menu ALARMS on betjeningspanet and reset the alarm here

# User settings

## Ventilation settings

### Stop the unit

If it is necessary to open the doors while servicing the unit, for instance when changing filters, the unit must be turned off.

The functions of the unit are activated in Settings under Operation.

If the unit is off, an icon appears on the main screen. 



↳ Operation	Settings: Description:	Off / On The unit must be turned off before the doors are opened during a service
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### Alarm

You can read warnings and alarms in the "Alarm" menu. It is likewise possible to reset warnings and alarms in this menu.

When a warning or an alarm has been triggered, an icon appears on the main screen 



↳ Alarm number and name	Description:	When selecting this, a list will appear showing the alarm ID number, information about the type of alarm, and whether it is critical or not. (See the alarm list for more information) You can approve the alarm by selecting "Clear Alarm"
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#### ATTENTION

When an alarm is active, it cannot be reset in the panel. When the alarm has been resolved, it will figure as inactive and it can be reset by selecting "Clear Alarm".

## Show data

It is possible to read off relevant data for Comfort units.



↳ Operating state	Description:	Shows the operating setting in which the unit is running.
↳ Bypass	Description:	Shows whether the bypass damper is open or closed.
↳ T2 Supply air	Description:	Shows the supply air temperature. If an after-heating element has been installed, T7 will be shown instead.
↳ T3 Extract air / Room	Description:	Shows the room temperature as an average of the entire house.
↳ T4 Discharge	Description:	Shows the discharge air temperature.
↳ T7 Supply air	Description:	Shows the supply air temperature provided an after-heating element has been installed. Otherwise T2 will be shown.
↳ T8 Outdoor air	Description:	Shows the outdoor temperature before reaching the pre-heating element.
↳ T9 Water heating element	Description:	Shows the temperature in the water after-heating element.
↳ Air humidity	Description:	Shows the current air humidity in the house.
↳ CO2	Description:	Shows the current CO2 level in the house (only if installed).
↳ Supply air fan	Description:	Shows the level at which the supply air fan is operating.
↳ Extract air fan	Description:	Shows the level at which the extract air fan is operating.
↳ Unit information	Description:	Select "Unit information" for more information.
↳ Unit type	Description:	Shows the name of the product the software has been set to work with.
↳ Software version	Description:	Shows the installed software version.
↳ Panel software	Description:	Shows installed software version on the panel.

## Date/Time

It is important to set date and time correctly. It makes it easier to localise errors indicated in an error report. When logging data, it is important to be able to follow the history. The time is shown under "Date / Time" in the display.

← Date / Time

↳ Year	Description:	Select "Year" in the panel and then select the correct year.
↳ Month	Description:	Select "Month" in the panel and then select the correct month.
↳ Day	Description:	Select "Day" in the panel and then select the correct day.
↳ Hour	Description:	Select "Hour" in the panel and then select the correct hour.
↳ Minute	Description:	Select "Minute" in the panel and then select the correct amount of minutes.

## Week program

You can program the unit to run in accordance with specific settings at fixed times during the week via a week program.

On the main screen an icon will be displayed when the week program is active



↳ Select program	Description:	You can select from the Programs 1, 2, 3 or off.
↳ Edit program	Description:	The selected week program is now active and can be edited.
↳ Monday	Description:	You can select either Monday, Tuesday, Wednesday, Thursday, Friday, Saturday or Sunday.
↳ Function 1	Description:	Under each function, you can set time, temperature and fan speed level.
↳ Start time	Settings: Standard setting: Description:	Hours and minutes 6:00 Set the time for the program to start. The program will run until the next change in the week program.
↳ Ventilation	Settings: Standard setting: Description:	Level 1 / Level 2 / Level 3 / Level 4 / Off Level 3 Select the desired fan speed level here.
↳ Temperatures	Settings: Standard setting: Description:	5 - 40 °C 22 °C Set the desired room temperature here.
↳ Function 2		Under each function, you can set time, temperature and fan speed level.
↳ Start time	Settings: Standard setting: Description:	Hours and minutes 8:00 Set the time for the program to start. The program will run until the next change in the week program.
↳ Ventilation	Settings: Standard setting: Description:	Level 1 / Level 2 / Level 3 / Level 4 / Off Level 1 Select the desired fan speed level here.
↳ Temperatures	Settings: Standard setting: Description:	5 - 40 °C 22 °C Set the desired room temperature here.
↳ Function 3	Description:	Under each function, you can set time, temperature and fan speed level.
↳ Start time	Settings: Standard setting: Description:	Hours and minutes 15:00 Set the time for the program to start. The program will run until the next change in the week program.
↳ Ventilation	Settings: Standard setting: Description:	Level 1 / Level 2 / Level 3 / Level 4 / Off Level 3 Select the desired fan speed level here.
↳ Temperatures	Settings: Standard setting: Description:	5 - 40 °C 22 °C Set the desired room temperature here.
↳ Function 4	Description:	Under each function, you can set time, temperature and fan speed level.

↳ Start time	Settings: Standard setting: Description:	Hours and minutes 22:00 Set the time for the program to start. The program will run until the next change in the week program.
↳ Ventilation	Settings: Standard setting: Description:	Level 1 / Level 2 / Level 3 / Level 4 / Off Level 1 Select the desired fan speed level here.
↳ Temperatures	Settings: Standard setting: Description:	5 - 40 °C 22 °C Set the desired room temperature here.
↳ Functions 5 and 6	Settings:  Standard setting: Description:	Under each function, you can set time, temperature and fan speed level. Off The program will run until the next change in the week program.
↳ Reset program	Description:	You can reset the program by selecting the approve icon.

## After-heating

This menu is only displayed if an after-heating element has been installed.



### ATTENTION

An after-heating element is not standard, but it can be purchased as an accessory.

If you wish to control the supply air temperature, an after-heating element must be installed. An after-heating element allows you to control the supply air temperature, regardless of the outdoor temperature.

An external electrical or water after-heating element can be installed in the supply air duct.

← After-heating

↳ Activate	Settings: Standard setting: Description:	Off / On Off You can turn the after-heating on or off here.
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## Air humidity

The primary purpose of ventilation is to extract humidity from the house so it does not damage the building, and to achieve a good indoor climate. During long periods with sub-zero temperatures, air humidity in the house may fall to a level that is critical for the building and for the indoor climate. Wooden floors, furniture and walls can be damaged by very dry air, which also whirls up dust, resulting in a poor indoor climate.

This is rectified by an integrated humidity control system that maintains good, relative air humidity. When the average air humidity in the house falls below a set level (default set at 30%), ventilation may be reduced. It will typically only be for a short period of time. This will help avoid further reduction of the air humidity in the house.

The humidity control system also has a function that allows increased ventilation, should the air humidity increase, for instance when having a bath. The risk of mould growth in the bathroom is reduced, and the bathroom mirror will rarely steam up.

The humidity control system follows the average air humidity level measured over the previous 24 hours. In this way the system automatically adapts to summer and winter conditions.

### ← Air humidity

↳ Vent.low humidity	Settings: Standard setting: Description:	Level 1 / Level 2 / Level 3 / Level 4 / Off Level 1 At low humidity, the unit changes to the set fan speed level.
↳ Low humidity level	Settings: Standard setting: Description:	15 ↔ 45 % 30 % The control system calculates an average air humidity level measured over the previous 24 hours. If the average air humidity in the extract air falls below this level, the "Low humidity" function will be activated.
↳ Vent.high humidity	Settings: Standard setting: Description:	Level 2 / Level 3 / Level 4 / Off Level 3 At high humidity levels, for instance when having a bath, the unit changes to the set fan speed level.
↳ Max time high humidity	Settings: Standard setting: Description:	1 ↔ 180 minutes / Off 60 minutes The function "High humidity" stops when actual humidity falls below 3% above the average air humidity. The run of this function has been time limited.



## CO2

This menu is only displayed if a CO2 sensor has been installed.



### ATTENTION

A CO2 sensor is not a standard part of all units, but may be purchased as an accessory.

If the number of people using a building varies considerably, controlling ventilation through the CO2 level in the extract air may be a good solution. This function is often used in offices and schools where use varies greatly during the day and during the week.

← CO2

↳ Vent.high CO2 level	Settings: Standard setting: Description:	Level 2 / Level 3 / Level 4 / Off Level 3 Here you indicate the fan speed level at which the unit is to operate at high CO2 levels.
↳ High CO2 level	Settings: Standard setting: Description:	650 ↔ 2500 ppm 800 ppm Here you indicate the CO2 level at which the unit is to switch to high fan speed level.
↳ Normal CO2 level	Settings: Standard setting: Description:	400 ↔ 750 ppm 600 ppm Here you indicate the CO2 level at which the unit is to switch to normal control.

## Air exchange

Low humidity in the dwelling can be prevented by reducing ventilation at low outdoor temperatures. This function can be used in countries with regular sub-zero temperatures and at high altitudes where the outdoor air is very dry.

This function can also be used at cold outdoor temperatures if no after-heating element has been installed, and the supply air feels too cold.

### ← Air exchange

↳ Winter low vent.	Settings: Standard setting: Description:	Level 1 / Level 2 / Level 3 / Off Off Here you indicate the fan speed level at which the unit will operate at low outdoor temperatures.
↳ Level winter low	Settings: Standard setting: Description:	-20 - 40 °C 0 °C Here you indicate the outdoor temperature at which to change to "Winter low".

## Air filter

The filter alarm has a timer. Its factory setting is 90 days between each filter change. If you want to add pressure-controlled filter change, pressure sensors can be connected via digital input and adjustment in the filter menu.

### ← Air filter

↳ Filter alarm	Settings: Standard setting: Description:	Filter monitor / 30 / 60 / 90 / 180 / 360 / monitor + 70 days 90 days The number of days between filter changes can be set as required. For optimal operation, it is important that filters are clean. A blocked exchanger will increase power consumption.
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## Temp. regulation

The settings are used to control the bypass damper if an after-heating element has not been installed.

If you wish to control the supply air temperature, an after-heating element must be installed. An after-heating element allows you to control the supply air temperature, regardless of the outdoor temperature.

An external electrical or water after-heating element can be installed in the supply air duct.



### ATTENTION

When heating is not needed in the dwelling, the supply air temperature may fall below the minimum temperature.

## ← Temp. regulation

↳ Min. supply air summer	Settings: Standard setting: Description:	5 ↔ 16 °C 14 °C Here you can set the minimum supply air temperature that the unit should provide in the summer. If the outdoor temperature is lower than indicated, the bypass damper will close and the unit will run on heat recovery.
↳ Min. supply air winter	Settings: Standard setting: Description:	14 ↔ 22 °C 16 °C Here you can set the minimum supply air temperature that the unit should provide in the winter. Only effective with an after-heating element.
↳ Max. supply air summer	Settings: Standard setting: Description:	16 ↔ 25 °C 22 °C Here you can set the maximum supply air temperature that the unit should provide when heating is required (only displayed on the panel if the unit is fitted with an after-heating element).
↳ Max. supply air winter	Settings: Standard setting: Description:	14 ↔ 22 °C 16 °C Here you can set the maximum supply air temperature that the unit should provide when heating is required in the winter (only displayed on the panel if the unit is fitted with an after-heating element).
↳ Summer change	Settings: Standard setting: Description:	5 ↔ 30 °C 12 °C Here you can set the minimum outdoor temperature for the unit to run in summer mode. If the outdoor air temperature is lower, the unit will run in winter mode.

# Language

The unit is factory-set to Danish language. You can change the texts to other languages.



↓ Danish	Description:	Select the desired language on the panel.
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# Alarm list







## Comfort unit



### Alarm list

The first column in the event log shows whether the event relates to master (M) or slave (3).

The list below relates to Comfort, and the events are divided into the following categories:

<b>Info</b>	Information	Normal operation is unaffected and no information is shown on the display.
	Warning	Operation continues, but something no longer functions optimally.
	Critical	Operation has stopped partially or completely, as a serious error requires immediate attention.

ID	Type	Display text	Description / cause	Rectification of error
1		Hardware error	Error in the hardware of the control system.	If resetting does not help, contact service.
2		Alarm timeout	A warning alarm has become a critical alarm.	Register alarm and reset. If the alarm does not disappear, contact service.
3		Fire alarm activated	Fire thermostat. The unit has stopped because the fire thermostat has been activated.	If there has been no fire, contact service.
7		Frost in after-heating element	Temperature sensors: Units without a T9 sensor: Frost thermostat in water heating element triggered. Units with a T9 sensor: Water heating element could not reach 20°C within 6 min.	Check for adequate insulation around the water heating element and its connections. Reset alarm.
8		Frost thermostat triggered	Temperature sensors: Only on units with a T9 sensor: Frost thermostat in water heating element triggered.	Check for adequate insulation around the water heating element and its connections. Reset alarm.
10	<b>Info</b>	Overheating of electrical after-heating	The electrical heating element has overheated. Lack of airflow due to, for instance, blocked filters, blocked air intake or defect supply air fan.	Check that air blows into the dwelling. Check the filter and the air intake. Reset alarm. If the above does not help, contact service.
11	<b>Info</b>	Low flow over the electrical heating-element	Lack of airflow in supply air. See alarm code 10.	See alarm code 10.
15		The room temperature is too low	When the room temperature is below 10°C, the unit will stop in order to prevent further cooling of the house. This may, for instance, be during a period when the house is unoccupied and the heating system is off.	Heat up the house and reset the alarm.
16	<b>Info</b>	Software error	Error in the control system program.	Contact Service.
17	<b>Info</b>	Watchdog warning	Error in the control system program.	Contact Service.

18	Info	Content of database changed	Parts of the program setting have been lost. This may be due to a prolonged power cut or a lightning strike. The unit will continue to run with standard settings.	Reset alarm. Set the desired week program. Contact service if the unit does not run to your satisfaction/ as before, as some subprograms may have been lost. (Subprogram is only available for service).
19	Info	Change filter	The filter monitor has been set at X amount of days for check-up/change of filter (30, 90, 180, 360 days). The standard setting is 90 days.	Clean/change filter. Reset alarm.
21	Info	Check date and time	Is displayed during power cuts.	The settings of the weekly clock must be checked and adjusted if necessary. Reset alarm.
22	Info	Error in air temperature	It is impossible to heat the supply air as desired (only applicable if you have an after-heating element). The after-heating element and the unit cannot increase the temperature to the desired level.	Set a lower supply air temperature. Reset alarm.
71		Error de-icing heat exchanger	Max. de-icing time exceeded for counterflow heat exchanger. This may be due to the unit being exposed to very low temperatures.	If resetting the alarm does not help, contact service. Register the current operating temperatures from the "SHOW DATA" menu in order to ease the service process.
91	Info	Missing expansion PCB	Expansion PCB is missing.	Contact service.
92	Info	Backup error	Error when writing or entering the installer's settings.	Contact service.
96		Error in damper test	Damper (open / closed) not fulfilled	Must be unset in the Alarm

# Product data

## Declaration of compliance



### EU/EC Declaration of Conformity

For the CE-marking inside the European Union

#### ***Nilan A/S***

We declare that the ventilation systems

Comfort CT150, Comfort 200TOP, Comfort 252TOP, Comfort 302TOP,  
Comfort 310LR, Comfort CT300, Comfort 300LR, Comfort 450, Comfort 600

Confirm to the following EU/EC Directives, providing the products are used in accordance with the ordinary use.

#### **EU-Directives:**

- Directive on harmonization of the laws of the Member States relating to electrical equipment to be used within certain voltage limits (the low voltage directive) 2014/35/EU
- Directive on harmonization of the laws of the Member States relating to electromagnetic compatibility ( EMC directive) 2014/30/EU
- Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS directive) 2011/65/EU
- Directive of Energy Related Products in a framework which primarily focuses on environmental care of requirements for energy-related products (ECODESIGN) 2009/125/EU

Harmonized standards applied and EU regulations, in particular:

EN 60335-1	EN 60730-1	(EU) 1253/2014
EN 60335-2-80	EN 50581	(EU) 1254/2014

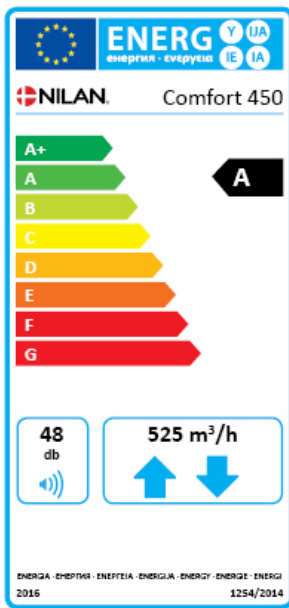
Hedensted: 2016-02-10



Henry Yndgaard Sørensen  
Senior Project Manager

Torben Andersen  
CEO

# Ecodesign data Comfort 450



SEC* average climate	- 38.8 kWh/(m <sup>2</sup> .a) <sup>2</sup> A
SEC cold climate	- 77.7 kWh/(m <sup>2</sup> .a) <sup>2</sup> A
SEC warm climate	- 15.5 kWh/(m <sup>2</sup> .a) <sup>2</sup> A
SEC-Class	A
Type	Residential ventilation unit
Type of drive	Variable speed drive
Type of heat recovery system	Recuperative (counterflow heat exchanger)
Temperature efficiency	86
Maximum flow rate	525 m <sup>3</sup> /h (100 Pa)
Supplied electrical power to the fans and management at maximum volume flow	190 W
Sound power level (LWA)	48 dB(A)
Reference flow rate	0.102 m <sup>3</sup> /s (367 m <sup>3</sup> /h)
Reference pressure difference	50 Pa
SPI	0.22 W/(m <sup>3</sup> /h) <sup>3</sup> /h)
Central demand control	0.85
Maximum internal leakage	1.9 %
Maximum external leakage	0.7 %
Visual filter warning	When a filter needs replacing, an alarm will be displayed on the control panel. NB! It is important to change filters regularly to sustain the performance and energy efficiency of the unit.
Disassembly instructions	<a href="http://www.nilan.dk">www.nilan.dk</a>

## \* Specific energy consumption

AEC - annual electricity consumption	362 kWh/year (100 m <sup>2</sup> ) <sup>2</sup>
AHS** average climate	4521 kWh (100 m <sup>2</sup> )
AHS** cold climate	8845 kWh (100 m <sup>2</sup> )
AHS** warm climate	2045 kWh (100 m <sup>2</sup> )

## \*\* Annual heating saved









## United Kingdom:

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